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The author observes, that the structure of the blood-corpuscles can be accurately learned only by a careful investigation of their mode of origin, and by following them through all their changes in the capillary vessels, and especially in the capillary plexuses and dilatations, where all their stages of transition from the colourless to the red corpuscles may be seen. The filament which forms here and there in the corpuscles of coagulating blood he has shown to other persons, with Microscopes made by Ross and Powell. Dr. Barry denies that he meant certain general remarks in his paper, referring to more than twenty delineations of corpuscles from various animals, to apply exclusively to those of man.

3. A paper was also in part read, entitled, "Experiments on the Gas Voltaic Battery, with a view of ascertaining the rationale of its action, and on its application to Eudiometry." By William Robert Grove, Esq., M.A., F.R.S., &c.

The President informed the Meeting that the Council had voted the following Address of Condolence to Her Majesty the Queen, on the occasion of the demise of His Royal Highness the Duke of Sussex:—

"To the Queen's Most Excellent Majesty.

"The humble Address of the President, Council, and Fellows of the Royal Society of London for improving Natural Knowledge.

"MOST GRACIOUS SOVEREIGN,

"We, Your Majesty's most dutiful and loyal subjects, the President, Council, and Fellows of the Royal Society of London for improving Natural Knowledge, beg leave to approach Your Majesty with the expression of our heartfelt condolence on the loss which Your Majesty has sustained by the lamented death of His Royal Highness the Duke of Sussex. In the expression of our sorrow we are sure that all Your Majesty's subjects must unite with us, when they regard the public and private virtues of His Royal Highness. We are bound to feel additional grief as a Society over which His Royal Highness had presided, and where he had uniformly shown the greatest zeal for the cause of knowledge, and the most amiable condescension and kindness to every cultivator of Physical Science."

May 18, 1843.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

James Tulloch, Esq., was balloted for, and duly elected into the Society.

1. The reading of a paper, entitled "Experiments on the Gas

Voltaic Battery, with a view of ascertaining the rationale of its Action and on its application to Eudiometry." By William Robert Grove, Esq., M.A., F.R.S., &c., was resumed and concluded.

The author, referring to a paper published in the Philosophical Magazine for December 1842, giving an account of a voltaic battery of which the active ingredients are gases, and by which the decomposition of water is effected by means of its composition, describes several variations in the form of the apparatus recorded in that paper. The experiments he has made with this new apparatus, and the details of which occupy the greater part of the present memoir, he conceives establish the conclusion that the phenomena exhibited in the gaseous battery are in strict conformity with Faraday's law of definite electrolysis. They also confirm him in the opinion which he had expressed in his original paper, and which had been controverted by Dr. Schöenbein, in a communication to the Philosophical Magazine for March 1843, as well as by other philosophers, namely, that the oxygen, in that battery, immediately contributes to the production of the voltaic current. Besides employing as the active agents oxygen and hydrogen gases, he extends his experiments to the following combinations: namely,

- Oxygen and peroxide of nitrogen;
- Oxygen and protoxide of nitrogen;
- Oxygen and olefiant gas;
- Oxygen and carbonic oxide;
- Oxygen and chlorine;
- Chlorine and dilute sulphuric acid;
- Chlorine and solutions of bromine and iodine in alternate tubes;
- Chlorine and hydrogen;
- Hydrogen and carbonic oxide;
- Chlorine and olefiant gas;
- Oxygen and binoxide of nitrogen;
- Oxygen and nitrogen, with solution of sulphate of ammonia;
- Carbonic acid and carbonic oxide, with oxalic acid as an electrolyte;

Hydrogen, nitrogen, and sulphate of ammonia.

The author concludes, on reviewing the whole of this series of experiments, that, with the exception, perhaps, of olefiant gas, which appears to give rise to an extremely feeble current, chlorine and oxygen, on the one hand, and hydrogen and carbonic oxide, on the other, are the only gases which are decidedly capable of electro-synthetically combining so as to produce a voltaic current. He thinks that the vapours of bromine and of iodine, were they less soluble, would probably also be found efficient as electro-negative gases.

He proceeds to consider, in the remaining part of his paper, the application of the gas battery to the purposes of eudiometry, founded on the circumstance already mentioned, that nitrogen gas, as well as several other gases, are absolutely without effect in as far as regards any alteration of their volume, and may therefore be advantageously employed in the analysis of atmospheric air, or other

mixed gases. Several experiments of this nature are described, and others suggested for future trial. Various theoretical views, arising from this train of inquiry, are then discussed; particularly with reference to the contact theory, with which the author conceives that the action of the gas battery is not reconcilable; and also to the source of the caloric evolved during voltaic action, which he is strongly inclined to think is in the battery itself.

2. A paper was also read, entitled "Contributions to Terrestrial Magnetism." No. IV. By Lieut.-Colonel Edward Sabine, R.A., F.R.S.

In the present number of these contributions, the author resumes the consideration of Captain Sir Edward Belcher's magnetic observations, of which the first portion, namely, that of the stations on the north-west coast of America and its adjacent islands, was discussed in No. 2. The return to England of H.M.S. *Sulphur* by the route of the Pacific Ocean, and her detention for some months in the China Seas, have enabled Sir Edward Belcher to add magnetic determinations at thirty-two stations to those at the twenty-nine stations previously recorded.

The author first describes the experiments which he instituted with the different needles employed by Captain Sir Edward Belcher for determining the coefficient to be employed in the formula for the temperature corrections; and takes this opportunity of noticing the singular fact that, in needles made of a particular species of Russian steel, this coefficient is negative; that is, in these needles, an increase of temperature increases the magnetic power. M. Adolphe Erman describes this particular kind of steel as consisting of alternate very thin layers of soft iron and of steel, so that when heated the soft iron layers increase their magnetic intensity and the steel layers diminish theirs.

He next considers the more important question of the steadiness with which the needles may have maintained their magnetic condition. By intercomparison of the results obtained at various stations with the different needles employed, he assigns corrections to be applied to the determination of the magnetic force deduced from the observed times of vibration. The magnetic force thus corrected, from the observations with each of the needles employed at the various stations visited by Sir Edward Belcher, is then given in a general table of results. The observations of the inclination of the needle are given in another table; and a third table contains the determination of the declination and inclination of the needle, the horizontal and total magnetic intensity deduced from the observations at thirty-two stations, of which the latitudes and longitudes are given in the same table, together with the dates of observation,
